Roles and Research Trends of Artificial Intelligence in Mathematics Education: A Bibliometric Mapping Analysis and Systematic Review

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Abstract

Learning mathematics has been considered as a great challenge for many students. The advancement of computer technologies, in particular, artificial intelligence (AI), provides an opportunity to cope with this problem by diagnosing individual students' learning problems and providing personalized supports to maximize their learning performances in mathematics courses. However, there is a lack of reviews from diverse perspectives to help researchers, especially novices, gain a whole picture of the research of AI in mathematics education. To this end, this research aims to conduct a bibliometric mapping analysis and systematic review to explore the role and research trends of AI in mathematics education by searching for the relevant articles published in the quality journals indexed by the Social Sciences Citation Index (SSCI) from the Web of Science (WOS) database. Moreover, by referring to the technology-based learning model, several dimensions of AI in mathematics education research, such as the application domains, participants, research methods, adopted technologies, research issues and the roles of AI as well as the citation and co-citation relationships, are taken into account. Accordingly, the advancements of AI in mathematics education research are reported, and potential research topics for future research are recommended.